

IN THE CLAIMS:

Amend claims 1-27, cancel claims 28-33, and add new claims 34-39 as shown in the following listing of claims, which replaces all previous versions and listings of claims.

1. (currently amended) A method of manufacturing a mirror having a reflection surface vertical to ~~the~~ a surface of a silicon substrate, comprising: comprising, a step of forming ~~a mask for forming~~ a mask material ~~to the~~ on a surface of the ~~substrate,~~ an silicon substrate; an anisotropic dry etching step of anisotropically dry etching the silicon substrate to form ~~substrate,~~ and an anisotropic wet etching step of anisotropically wet etching the substrate, and forming a surface disposed substantially parallel with a crystal face ~~in~~ perpendicular to the surface of the silicon substrate; and ~~an~~ by the anisotropic dry etching step and then forming the reflection surface by the anisotropic wet etching step of anisotropically wet etching the silicon substrate including the crystal face and the surface disposed substantially parallel with the crystal face to form a reflection surface.

2. (currently amended) A method of manufacturing a mirror according to ~~claim 1,~~ wherein claim 1; wherein in the anisotropic dry etching step, an angle formed between a portion of a ~~fabrication~~ side wall ~~formed to~~ of the silicon

substrate corresponding at least ~~corresponding~~ to the reflection surface and the surface of the silicon substrate is $90^\circ \pm 3^\circ$ ~~in the anisotropic dry etching step.~~

3. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein the~~ claim 1; wherein in the anisotropic dry etching step, a surface roughness for ~~the~~ a portion of the ~~fabricated~~ side wall ~~formed to~~ of the silicon substrate corresponding at least ~~corresponding~~ to the reflection surface is 300 nm or less ~~in the anisotropic dry etching step.~~

4. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein~~ claim 1; wherein the anisotropic dry etching step further comprises the step of providing a silicon exposed portion ~~is provided~~ to the outer periphery of the silicon substrate ~~in the anisotropic dry etching step.~~

5. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein~~ claim 1; further comprising a cleaning step of cleaning the silicon substrate ~~is included~~ between the anisotropic dry etching step and the anisotropic wet etching step.

6. (currently amended) A method of manufacturing a mirror according to ~~claim 5, wherein~~ claim 5; wherein the cleaning step comprises a step of irradiating the silicon substrate with oxygen plasma ~~is irradiated to the substrate in the cleaning step.~~

7. (currently amended) A method of manufacturing a mirror according to ~~claim 5, wherein~~ claim 5; wherein the cleaning step comprises the step of irradiating the silicon substrate with argon plasma ~~is irradiated to the substrate in the cleaning step.~~

8. (currently amended) A method of manufacturing a mirror according to ~~claim 5, wherein~~ claim 5; wherein the cleaning step comprises a step of immersing the silicon substrate ~~is immersed~~ in a liquid mixture of sulfuric acid and an aqueous hydrogen peroxide ~~in the cleaning step.~~

9. (currently amended) A method of manufacturing a mirror according to ~~claim 5, wherein~~ claim 5; wherein the cleaning step comprises a step of immersing the silicon substrate ~~is immersed~~ in a heated sulfuric acid ~~in the cleaning step.~~

10. (currently amended) A method of manufacturing a mirror according to ~~claim 1~~, wherein claim 1; wherein the anisotropic dry etching step comprises anisotropically dry etching the silicon substrate using as the etchant is an aqueous solution of potassium hydroxide ~~in the anisotropic wet etching step~~.

11. (currently amended) A method of manufacturing a mirror according to ~~claim 1~~, wherein claim 1; wherein the anisotropic wet etching step comprises anisotropically wet etching the silicon substrate using as the etchant is potassium hydroxide ~~with addition of to which is added isopropyl alcohol in the anisotropic wet etching step~~.

12. (currently amended) A method of manufacturing a mirror according to ~~claim 1~~, wherein claim 1; wherein the anisotropic wet etching step comprises anisotropically wet etching the silicon substrate using as the etchant is tetramethyl ammonium hydroxide ~~in the anisotropic wet etching step~~.

13. (currently amended) A method of manufacturing a mirror according to ~~claim 12~~, wherein claim 12; wherein the etchant is tetramethyl ammonium hydroxide ~~in the anisotropic wet etching step~~, and the liquid has a temperature is of 60°C or higher and 70°C or lower.

14. (currently amended) A method of manufacturing a mirror according to ~~claim 12~~, wherein claim 12; wherein the etchant is an aqueous solution of tetramethyl ammonium hydroxide; and wherein an ~~in the anisotropic wet etching step,~~ and the etching amount is 0.5 μ m or more and 3 μ m or less.

15. (currently amended) A method of manufacturing a mirror according to ~~claim 1~~, wherein claim 1; wherein the anisotropic wet etching step comprises anisotropically wet etching the silicon substrate using as the etchant is tetramethyl ammonium hydroxide with addition of to which is added silicon in the anisotropic wet etching step.

16. (currently amended) A method of manufacturing a mirror having a reflection surface vertical to a surface of a silicon substrate, comprising: a step of forming a mask material on a surface of the silicon substrate; an anisotropic dry etching step of anisotropically dry etching the silicon substrate to form a surface disposed substantially parallel with a crystal face perpendicular to the surface of the silicon substrate; and an anisotropic wet etching step of anisotropically wet etching the silicon substrate including the crystal face and the surface disposed substantially parallel with the crystal face to form a reflection surface; wherein the anisotropic wet etching step comprises

anisotropically wet etching the silicon substrate using as
~~according to claim 1, wherein the etchant is tetramethyl~~
~~ammonium hydroxide with addition of~~ to which are added silicon
and ammonium persulfate ~~in the anisotropic wet etching step.~~

17. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein~~ claim 1; wherein the
anisotropic wet etching step comprises anisotropically wet
etching the silicon substrate using as the etchant ~~is~~ ammonia
~~with addition of~~ to which is added arsenic oxide ~~in the~~
~~anisotropic wet etching step.~~

18. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein~~ claim 1; wherein the
~~crystal face on the~~ surface of the silicon substrate is a
{100} crystal face, and the ~~crystal face as the~~ reflection
surface is a {100} crystal face or a {110} crystal face.

19. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein~~ claim 1; wherein the
~~crystal face on the~~ surface of the silicon substrate is a
{100} crystal face, and the ~~crystal face as the~~ reflection
surface is a {100} crystal face, a {110} crystal face, or a
{111} crystal face.

20. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein the crystal face in claim 1; wherein~~ the surface of the silicon substrate is a {111} crystal face, and the ~~crystal face as~~ the reflection surface is a {110} crystal face.

21. (currently amended) A method of manufacturing a mirror according to ~~claim 1, including a claim 1; further comprising the~~ step of coating a thin film on the reflection surface.

22. (currently amended) A method of manufacturing a mirror according to ~~claim 21, wherein claim 21; wherein~~ the thin film is formed of at least one layer of a metal film ~~in the step of coating the thin film on the reflection surface.~~

23. (currently amended) A method of manufacturing a mirror according to ~~claim 21, wherein claim 21; wherein~~ the thin film is formed of at least one layer of a dielectric material ~~in the step of coating the thin film on the reflection surface.~~

24. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein the film deposition method for the thin film is claim 21; wherein the step of~~ coating a thin film on the reflection surface comprises vacuum

vapor-depositing the thin film on the reflection surface by an oblique vapor deposition method using a vacuum vapor deposition method in the step of coating the thin film on the reflection surface.

25. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein the film deposition method for the thin film is~~ claim 21; wherein the step of coating a thin film on the reflection surface comprises depositing the thin film on the reflection surface by a sputtering method in the step of coating the thin film on the reflection surface.

26. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein the film deposition method for the thin film is~~ claim 21; wherein the step of coating a thin film on the reflection surface comprises depositing the thin film on the reflection surface by a plating method in the step of coating the thin film on the reflection surface.

27. (currently amended) A method of manufacturing a mirror according to ~~claim 1, wherein the film deposition method for the thin film is~~ claim 21; wherein the step of coating a thin film on the reflection surface comprises depositing the thin film on the reflection surface by an ion plating method in the step of coating the thin film on the reflection surface.

28. - 33. (canceled)

34. (new) A method of manufacturing a mirror according to claim 1; wherein during the anisotropic dry etching step the surface of the silicon substrate is scalloped; and wherein during the anisotropic wet etching step the scalloping formed on the surface of the silicon substrate is removed.

35. (new) A method of manufacturing a mirror according to claim 1; wherein the anisotropic dry etching step includes the step of deep groove etching the silicon substrate to provide concavely-formed indented portions; and wherein the anisotropic wet etching step includes the step of removing the concavely-formed indented portions.

36. (new) A method of manufacturing a micro-mirror, comprising the steps of:

forming a mask material on a surface of a silicon substrate;

anisotropically dry etching the silicon substrate to obtain a crystal face having concave indented portions and being disposed substantially parallel with a second crystal face disposed generally perpendicular to the surface of the silicon substrate; and

anisotropically wet etching the silicon substrate to remove the concave indented portions from the first crystal face and form a reflection surface comprising the second crystal face.

37. (new) A method of manufacturing a mirror according to claim 36; wherein the first crystal face is a {100} crystal face, and the second crystal face is a {100} crystal face or a {110} crystal face.

38. (new) A method of manufacturing a mirror according to claim 36; wherein the first crystal face is a {100} crystal face, and the second crystal face is a {100} crystal face, a {110} crystal face, or a {111} crystal face.

39. (new) A method of manufacturing a mirror according to claim 36; wherein the first crystal face is a {111} crystal face and the second crystal face is a {110} crystal face.